

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:	§
Abbas Razavi	§
	§
Serial No.: 10/535,520	§ Group Art Unit: 1796
	§
Confirmation No.: 9377	§
	§
Filed: February 2, 2006	§ Examiner: C. Caixia Lu
	§
For: POLYOLEFIN PRODUCTION	§ Atty Docket No.: F-863

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Honorable Commissioner:

APPEAL BRIEF

Appellants submit this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1796 dated July 21, 2008, finally rejecting claims 22-26 and 28-45.

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Real Party in Interest

The present application has been assigned to Total Petrochemicals Research
Feluy, Zone Industrielle C, B-7181, Feluy, Belgium.

Related Appeals and Interferences

Appellants assert that no other appeals, interferences or judicial proceedings are known to the Appellants, the Appellants' legal representative or Assignee that will directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 22-26 and 28-45 are pending in the application. Claims 1-21 were canceled by Preliminary Amendment. Claims 27 and 46 were canceled in the Request for Continued Examination, dated January 22, 2008. Claims 22-26 and 28-45 stand rejected under 35 U.S.C. § 103(a). The rejection of the pending claims is appealed. The pending claims are shown in the attached Appendix A.

Status of Amendments

Claims 1-21 were canceled in a Preliminary Amendment. Amendments were made and entered to claims 24, 26-27, 31-34 and 39 in response to the First Office Action, dated April 12, 2007. Amendments were made to claims 22, 24, 33, and 43 and claims 27 and 46 were canceled in response to the Final Office Action, dated October 5, 2007, but were not entered until the Request for Continued Examination (RCE), filed January 22, 2008. No amendments to the claims were made in response to the First Office Action after RCE, dated March 3, 2008, nor in response to the Final Office Action after RCE, dated July 21, 2008. For purposes of appeal, the claims as listed in the response to the Final Office Action after RCE were entered and an explanation of how the claims were rejected was provided.

Summary of Claimed Subject Matter

Independent claim 22 recites an olefin polymerization catalyst composition that comprises a metallocene catalyst component characterized by the formula $Cp^1Cp^2R''MQ_p$. The Cp^1 and Cp^2 are each independently a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of Cp^1 and Cp^2 incorporates a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring, and wherein at least one of Cp^1 and Cp^2 is a substituted or unsubstituted fluorenyl group. The R'' is a structural bridge between Cp^1 and Cp^2 imparting stereorigidity to the ligand structure provided that when Cp^1 incorporates a phosphorus atom in its cyclopentadienyl ring and Cp^2 is free of a phosphorus atom in its cyclopentadienyl ring, the bridge R'' is connected to the phosphorus atom in Cp^1 or to a carbon atom in Cp^1 which is distal to the phosphorus atom. The M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version). The Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms. The p is equal to the valence of the transition metal M minus 2. *See*, specification, at least at page 3, first paragraph and last paragraph; and page 4 to page 5 bridging paragraph.

Independent claim 43 recites a process for the polymerization of an ethylenically unsaturated monomer that comprises (a) providing a metallocene catalyst component characterized by the formula $Cp^1Cp^2R''MQ_p$; (b) providing an activating co-catalyst component; (c) contacting said metallocene catalyst component and said activating co-catalyst component in a polymerization reaction zone with an ethylenically unsaturated monomer to produce a polymer product by the polymerization of said monomer; and (d) recovering said polymer product from said reaction zone. The Cp^1 and Cp^2 are each

independently a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of Cp¹ and Cp² incorporates a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring, and wherein at least one of Cp¹ and Cp² is a substituted or unsubstituted fluorenyl group. The R" is a structural bridge between Cp¹ and Cp² imparting stereorrigidity to the ligand structure provided that when Cp¹ incorporates a phosphorus atom in its cyclopentadienyl ring and Cp² is free of a phosphorus atom in its cyclopentadienyl ring, the bridge R" is connected to the phosphorus atom in Cp¹ or to a carbon atom in Cp¹ which is distal to the phosphorus atom. The M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version). The Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms. The p is equal to the valence of the transition metal M minus 2. *See*, specification, at least at page 3, first paragraph and last paragraph; page 4, second paragraph; page 4 to page 5, bridging paragraph; page 10, last paragraph; page 11 to page 12, bridging paragraph; page 12, first full paragraph and last paragraph; page 13, second to last paragraph; page 13 to page 14, bridging paragraph; page 14, all paragraphs.

Dependent claim 42 recites wherein the catalyst component of Independent claim 22 is selected from the group consisting of Me₂Si(pyrrolyl)FluZrCl₂, Et(pyrrolyl)FluZrCl₂, Me₂Si(Imidazolyl)FluZrCl₂, Et(Imidazolyl)FluZrCl₂, Me₂Si(phospholyl)FluZrCl₂, and Et(phospholyl)FluZrCl₂. *See*, specification, at least at page 10, second paragraph.

The claimed invention provides for a catalyst component and catalyst system for use in preparing polyolefins, and a process for producing polyolefins using the catalyst

component or catalyst system, wherein the catalyst component or catalyst system is more stable and withstands higher temperatures in a polymerization reaction. *See*, specification, at least at page 2, last paragraph.

Grounds of Rejection to be Reviewed on Appeal

1. The rejection of claims 22-26 and 28-45 under 35 U.S.C. § 103(a) as being unpatentable over Katayama et al. (EP 0 741 145).

Arguments

I. THE EXAMINER ERRED IN REJECTING CLAIMS 22-26 AND 28-45 UNDER 35 U.S.C. §103(A) AS BEING UNPATENTABLE OVER KATAYAMA ET AL.

Katayama teaches a catalyst for polymerizing olefin and a process for preparing polyolefin. (*Katayama*, B1, page 2, paragraph [0001], lines 3; *Katayama*, A1, page 2, line 7). Specifically, *Katayama* teaches a catalyst comprising a transition metal compound, an organoaluminum compound, and compound forming an ionic complex by reacting with a transition metal compound. (*Katayama*, B1, page 2, paragraph [0006], lines 30-60; and page 3, paragraph [0006], lines 1-31; *Katayama*, A1, page 2, lines 41-60, and page 3, lines 1-21). *Katayama* discloses a laundry list of compounds that serve as the transition metal compound. (See *Katayama*, B1, pages 3-6, paragraphs [0009]-[0019]; *Katayama*, A1, page 5, lines 14-60, pages 6-8, and page 9, lines 1-18). *Katayama* B1 mentions prior art that disclose the use of phosphorous or nitrogen atoms in cyclic ligands. (See *Katayama*, B1, page 2, paragraph [0004], lines 24-26). *Katayama* A1 discloses that compound A “may be substituted with a group containing a nitrogen atom, a phosphorous atom, an oxygen atom, a sulfur atom or a silicon atom” and the description of the groups containing a nitrogen or phosphorous atom are just that, groups. (See *Katayama*, A1, page 4, lines 6-9 and 16-32).

The Examiner states that *Katayama* teaches a metallocene catalysts complex for olefin polymerization and the complexes are selected from those such as ethylenecyclopentadienyl pyrrolyl titanium dichloride and dimethylsilylindenyl triphenylphospholyl titanium dichloride. (First Office Action after RCE, dated March 3, 2008, page 2, last paragraph). The Examiner referenced these complexes and stated that they could be found at page 5, line 58 and page 7, lines 12-13, respectively, of *Katayama*. (First Office Action after RCE, dated March 3, 2008, page 2, last paragraph).

The Examiner further states that *Katayama* “does not exclude any bridge position relative to nitrogen or phosphorous position in the ring” and that “one would have understood that all positions including nitrogen and phosphorus position in the ring can be bridging position.” (First Office Action after RCE, dated March 3, 2008, page 2, last paragraph). The Examiner further states that the ring structure disclosed in *Katayama* exemplifies both substituted or unsubstituted fluorenyl groups. (First Office Action after

RCE, dated March 3, 2008, page 2, last paragraph). Therefore, the Examiner argues, it would have been obvious to a skilled artisan to replace the cyclopentadienyl or indenyl groups of *Katayama* with fluorenyl groups. (First Office Action after RCE, dated March 3, 2008, page 3, first paragraph).

In the Final Office Action after RCE, the Examiner states that *Katayama*'s disclosure does not use paragraph numbers, but the reference (provided as evidence for this appeal) clearly has paragraph numbers. (Final Office Action after RCE, dated July 21, 2008, page 2, third paragraph). Appellants have discovered that the Examiner was referring to the A1 version of *Katayama*, whereas Appellants were using the B1 version. Appellants will use paragraph, page, and line numbers as much as possible when referencing *Katayama*, and will provide reference, where applicable to both the A1 and B1 versions.

"To establish a *prima facie* case of obviousness . . . there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." *See*, MPEP §2142.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to combine or modify reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. *See*, MPEP §706.02(j); *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Supreme Court recently rejected a formalistic and rigid application of the teaching, suggestion, or motivation test as an exclusive test in the obviousness inquiry, it nevertheless made clear that an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). The Supreme Court further stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine elements in the way the claimed new invention does." *Id.*

Appellant respectfully argues that there is no motivation to modify the reference, nor does it provide a *prima facie* case of obviousness. First, the reference relied upon,

coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify the reference. *See, Karsten Mfg. Corp. v. Cleveland Gulf Co.*, 242 F.3d 1376, 1385 (Fed. Cir. 2001). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *See, Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209 (Fed. Cir. 1991).

The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. *See, In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

Appellant argues that *Katayama* does not teach, show, or suggest the currently pending claims. Independent claims 22 and 43 state that at least one of Cp¹ and Cp² must be a fluorenyl group.

Particularly, Appellant argues that *Katayama* broadly discloses metallocene structures. (See paragraphs [0006]-[0019] of *Katayama*, B1, and page 3, lines 33-60, pages 4-8, and page 9, lines 1-18 of *Katayama*, A1). *Katayama* does not disclose a catalyst system comprising a fluorenyl or the specific catalyst systems listed in claim 42. (See paragraphs [0006]-[0019] and Examples of *Katayama*, B1, and page 3, lines 33-60, pages 4-8, and page 9, lines 1-18 of *Katayama*, A1). Bridged fluorenyl-containing metallocene catalyst components in general, and the bridged fluorenyl-containing metallocene catalyst components presently claimed in particular, have a very specific electronic environment and do not have isomers like the bisindenyl catalyst components. Furthermore, *Katayama* does not disclose, teach, suggest, or show the presently claimed catalyst having the specific structure, including the fact that at least one of Cp¹ and Cp² must be a fluorenyl group and that the structural bridge is positioned at a particular point depending on whether a phosphorous or nitrogen atom is present. *Katayama* (both A1 and B1) discloses broadly metallocene structures, but does not rise to the level of particularity as is presently claimed. Additionally, there is no motivation to alter the general teachings of *Katayama* to obtain the very specific catalyst component claimed.

Also, the Examiner states that “one would have understood that all positions including nitrogen or phosphorus position in the ring can be a bridging position”, but the

Examiner failed to state any evidence supporting this statement. (First Office Action after RCE, dated March 3, 2008, page 2, last paragraph). Appellant requested an affidavit, under 37 C.F.R. 1.104, from the Examiner providing such support, but did not receive such an affidavit.

Appellant submits that there is no motivation (nor a reasonable expectation of success) to modify the teachings of *Katayama* to obtain the catalyst composition or the polymerization process using the catalyst composition.

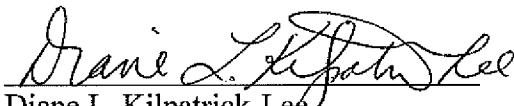
Based on such arguments, Appellant respectfully requests reversal of the rejection.

Conclusion

In conclusion, the reference of record does not teach, show or suggest the catalyst component or system and the polymerization process using the catalyst component or system as recited in the pending claims. Thus, Appellant respectfully requests reversal of the rejections of claims 22-26 and 28-45.

Respectfully submitted,

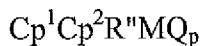
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Appendix A - Pending Claims

22. A olefin polymerization catalyst composition comprising a metallocene catalyst component characterized by the formula:



wherein:

(a) Cp^1 and Cp^2 are each independently a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of Cp^1 and Cp^2 incorporates a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring, and wherein at least one of Cp^1 and Cp^2 is a substituted or unsubstituted fluorenyl group;

(b) R'' is a structural bridge between Cp^1 and Cp^2 imparting stereorrigidity to the ligand structure provided that when Cp^1 incorporates a phosphorus atom in its cyclopentadienyl ring and Cp^2 is free of a phosphorus atom in its cyclopentadienyl ring, the bridge R'' is connected to the phosphorus atom in Cp^1 or to a carbon atom in Cp^1 which is distal to the phosphorus atom;

(c) M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version);

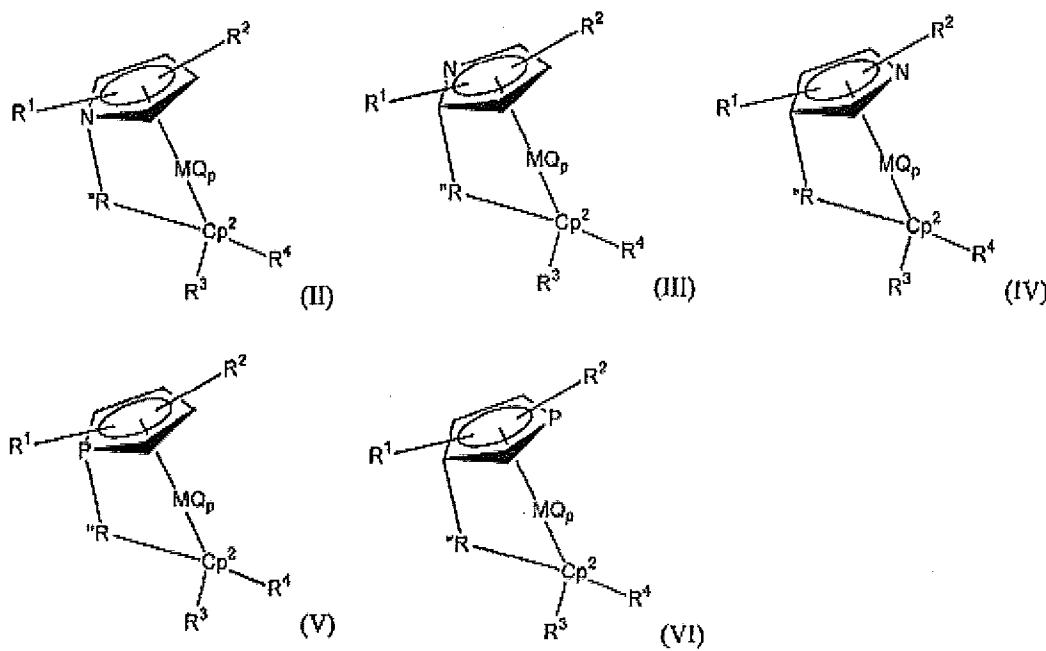
(d) Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms; and

(e) p is equal to the valence of the transition metal M minus 2.

23. The composition of claim 22 wherein one of Cp^1 or Cp^2 incorporates a nitrogen atom in its cyclopentadienyl ring, and R'' is attached to the nitrogen atom, to a carbon atom vicinal to the nitrogen atom, or to a carbon atom non-vicinal to the nitrogen atom.

24. The composition of claim 22 in which Cp^1 and Cp^2 are each independently a substituted or unsubstituted fluorenyl group, wherein at least one of Cp^1 and Cp^2 incorporate a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring.

25. The composition of claim 22 wherein the catalyst component is characterized by one of the following formulas (II) – (VI):



wherein R^1 , R^2 , R^3 and R^4 may be the same or different and are selected from the group consisting of a halogen and $C_1 - C_{20}$ alkyl, aryl, cycloalkyl, alkoxy and silanyl groups.

26. The composition of claim 22 wherein Cp^1 is a substituted or unsubstituted cyclopentadienyl group and Cp^2 is a substituted or unsubstituted fluorenyl group, wherein at least one of Cp^1 and Cp^2 incorporate a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring.
28. The composition of claim 22 wherein M is Ti, Zr, Hf, or V.
29. The composition of claim 28 wherein p is 2.
30. The composition of claim 29 wherein Q is Cl.
31. The composition of claim 22 wherein R'' is substituted or unsubstituted and is selected from the group consisting of an alkylidene group having from 1-20 carbon atoms, a dialkyl germanium group, a dialkyl silicon group, a dialkyl siloxane group, an alkyl phosphine group and an amine group.

32. The catalyst of claim 31 wherein R["] comprises an Me₂Si group or an Et group.

33. The catalyst of claim 22 wherein at least one of Cp¹ and Cp² are substituted with substituents which are independently selected from the group consisting of aryl groups having from 1-20 carbon atoms, hydrocarbyl groups having from 1-20 carbon atoms, cycloalkyls, silane derivatives, alkoxies and halogens.

34. The composition of claim 33 wherein said substituents are independently selected from the group consisting of Ph, Bz, Naph, Ind, BzInd, Me, Et, n-Pr, i-Pr, n-Bu, and Me₃Si.

35. The composition of claim 34 wherein the substituents are methyl groups.

36. The composition of claim 22 wherein the metallocene catalyst component is immobilized on a solid support.

37. The composition of claim 22 further comprising an aluminum- or boron-containing co-catalyst capable of activating the catalyst component.

38. The composition of claim 22 wherein Cp¹ incorporates a nitrogen or phosphorus atom and is a cyclopentadienyl group or an indenyl group which is substituted or unsubstituted and Cp² is a substituted or unsubstituted fluorenyl group.

39. The composition of claim 38 wherein Cp¹ is a substituted or unsubstituted cyclopentadienyl group and Cp² is a fluorenyl group with at least one substituent at the 3- or 6-position, or at the 2- or 7-position, wherein Cp¹ incorporates a nitrogen (N) or phosphorus (P) atom.

40. The composition of claim 39 wherein said fluorenyl group is disubstituted with substituents at the 3- and 6-positions or at the 2- and 7-positions.

41. The composition of claim 40 wherein said substituents are methyl groups.

42. The composition of claim 22 wherein said catalyst component is selected from the group consisting of: $\text{Me}_2\text{Si}(\text{pyrrolyl})\text{FluZrCl}_2$, $\text{Et}(\text{pyrrolyl})\text{FluZrCl}_2$, $\text{Me}_2\text{Si}(\text{Imidazolyl})\text{FluZrCl}_2$, $\text{Et}(\text{Imidazolyl})\text{FluZrCl}_2$, $\text{Me}_2\text{Si}(\text{phospholyl})\text{FluZrCl}_2$, and $\text{Et}(\text{phospholyl})\text{FluZrCl}_2$.

43. A process for the polymerization of an ethylenically unsaturated monomer comprising:

- providing a metallocene catalyst component characterized by the formula:
$$\text{Cp}^1\text{Cp}^2\text{R}''\text{MQ}_p$$
wherein:
 - Cp^1 and Cp^2 are each independently a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of Cp^1 and Cp^2 incorporates a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring, and wherein at least one of Cp^1 and Cp^2 is a substituted or unsubstituted fluorenyl group;
 - R'' is a structural bridge between Cp^1 and Cp^2 imparting stereorigidity to the ligand structure provided that when Cp^1 incorporates a phosphorus atom in its cyclopentadienyl ring and Cp^2 is free of a phosphorus atom in its cyclopentadienyl ring, the bridge R'' is connected to the phosphorus atom in Cp^1 or to a carbon atom in Cp^1 which is distal to the phosphorus atom;
 - M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version);
 - Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms; and
 - p is equal to the valence of the transition metal M minus 2;
- providing an activating co-catalyst component;
- contacting said metallocene catalyst component and said activating co-catalyst component in a polymerization reaction zone with an ethylenically

unsaturated monomer to produce a polymer product by the polymerization of said monomer; and

(d) recovering said polymer product from said reaction zone.

44. The method of claim 43 wherein said ethylenically unsaturated monomer is ethylene or propylene.

45. The method of claim 44 wherein said monomer comprises propylene and said polymer product is a polypropylene homopolymer or copolymer.

Appendix B - Evidence

1. *Katayama et al.*, European Patent Specification No. 0 741 145B1
2. *Katayama et al.*, European Patent Application No. 0 741 145A1
3. MPEP §2142.
4. MPEP §706.02(j).
5. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).
6. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007).
7. *Karsten Mfg. Corp. v. Cleveland Gulf Co.*, 242 F.3d 1376 (Fed. Cir. 2001).
8. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200 (Fed. Cir. 1991).
9. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

Appendix C - *Related Proceedings*

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